United States Patent [19]

Hagen et al.

[11] **3,901,565**

[45] **Aug. 26, 1975**

[54] **ADAPTOR AND LATCHING MEANS FOR REMOVABLY ATTACHING DRAWERS TO TELESCOPING BALL BEARING DRAWER SLIDES**

[76] Inventors: **Magnus F. Hagen,** 3713 Twilight Dr., Fullerton, Calif. 92632; **Fred A. Jordan,** 14906 Lodosa, Whittier, Calif. 90605

[22] Filed: **Sept. 23, 1974**

[21] Appl. No.: **508,727**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 396,593, Sept. 12, 1973, abandoned.

[52] **U.S. Cl.** **308/3.8;** 312/332

[51] **Int. Cl.²** **F16C 21/00**

[58] **Field of Search** 308/3.8; 312/341, 343, 312/344, 331, 332, 333, 350, 348

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Primary Examiner—M. Henson Wood, Jr.
Assistant Examiner—Gene A. Church
Attorney, Agent, or Firm—J. Carroll Baisch

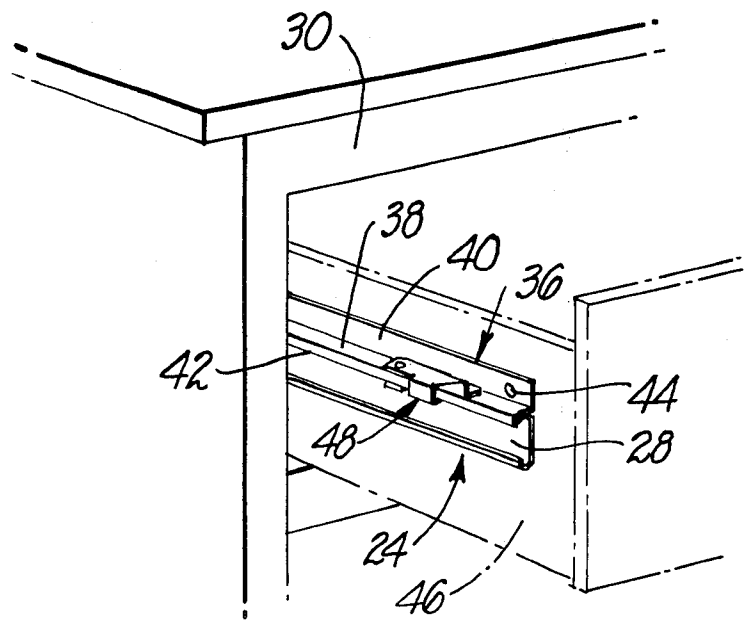
[57] **ABSTRACT**

A progressive, full ball bearing, precision, telescoping slide mechanism for the suspension of drawers having an adaptor attached to the drawer to provide simple attachment without tools to the drawer and to permit the drawer to be easily — without tools — removed from the slide when it is desired to do so, and readily reinserted, or interchanged with other drawers. When the drawer is carried by the usual two slides with the adaptors resting on the slides, there is means for releasably locking the adaptors to the outer slide mechanism for positively securing the drawer in place on the slides. The latching mechanism in one arrangement is manually operated. In another arrangement, the latching mechanism latches automatically. Another feature is a combination of stops which will absorb any metal clicking noise at times of opening or closing of drawer, thus, contributing to the elimination of today's harmful "noise pollution" modern office ecology is exposed to.

Still another feature comprises means to hold a drawer in the closed position so that a slight forward tilt of the drawer or cabinet will not let the drawer come out as the slides roll very easily. Also, a too forcefully closed drawer has a tendency to come out against, that is, to bounce open. With the present invention, these conditions are overcome.

In removing a drawer, or replacing same on the slide mechanisms, the adaptors slide on the outer slide members and it is extremely important that there be no projections on the slides of the adaptors that contact the outer slide members and slide thereon. Hence, there are certain details embodied in the adaptors that are important to the proper functioning thereof. These details will be further described hereandafter

16 Claims, 18 Drawing Figures



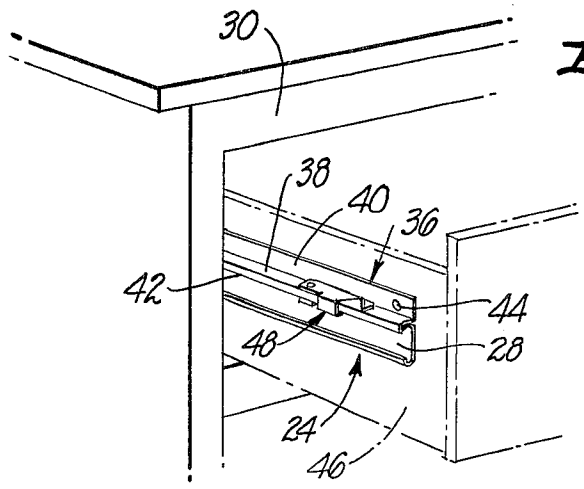


FIG. 1.

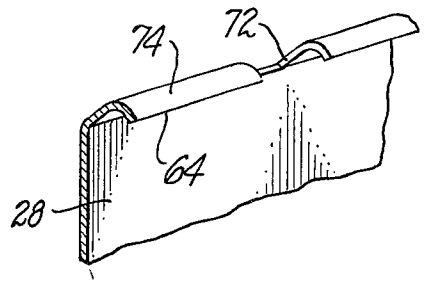


FIG. 7.

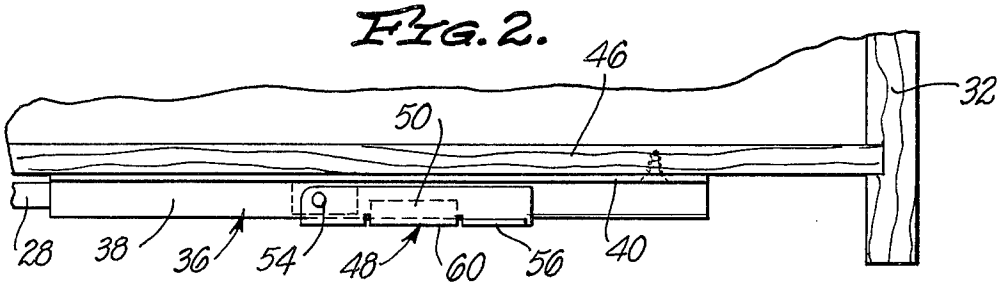


FIG. 2.

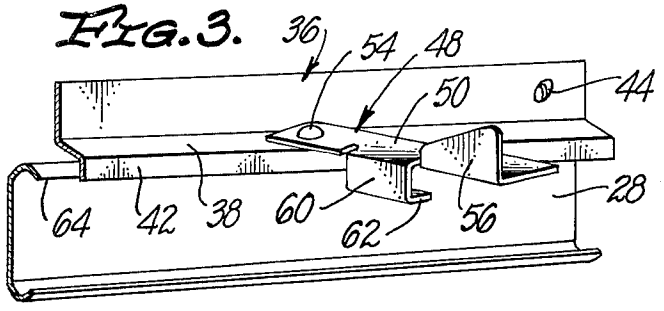


FIG. 3.

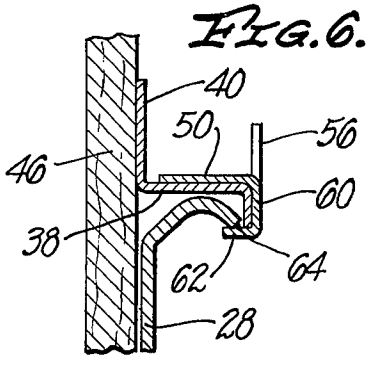


FIG. 6.

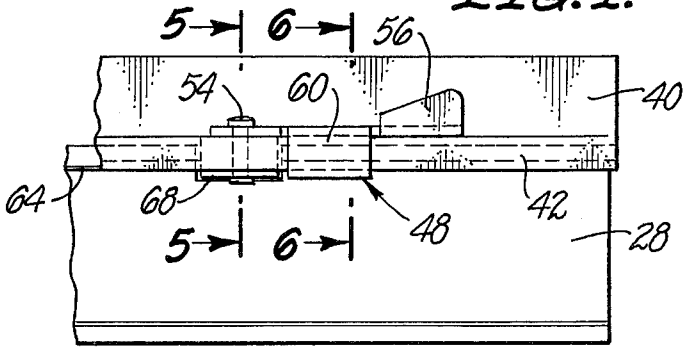


FIG. 4.

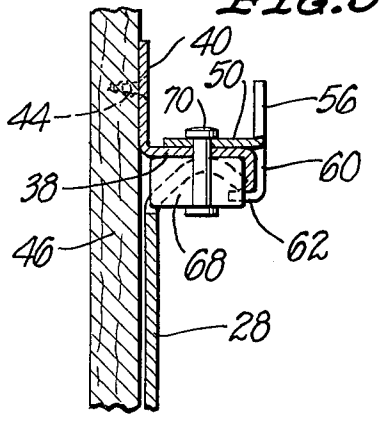


FIG. 5

FIG. 8.

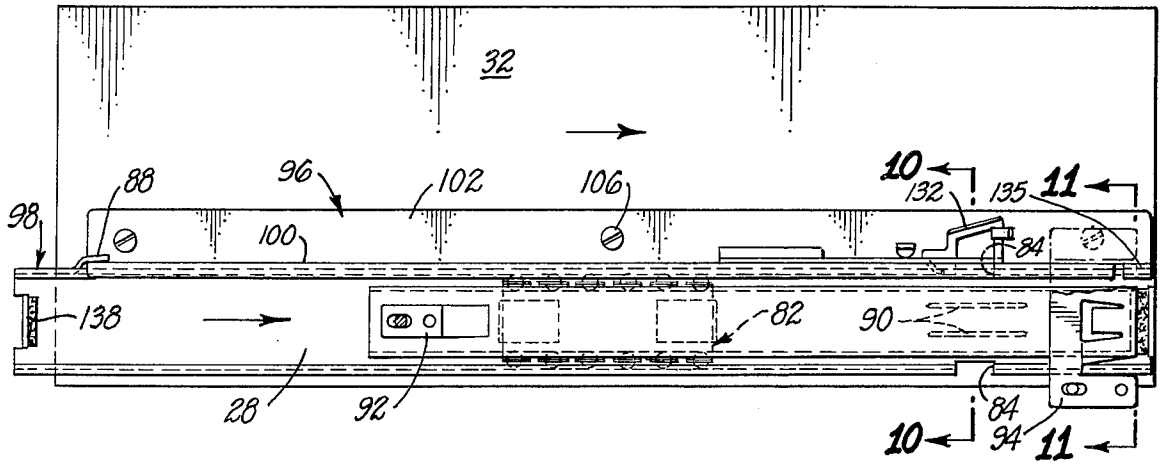


FIG. 9.

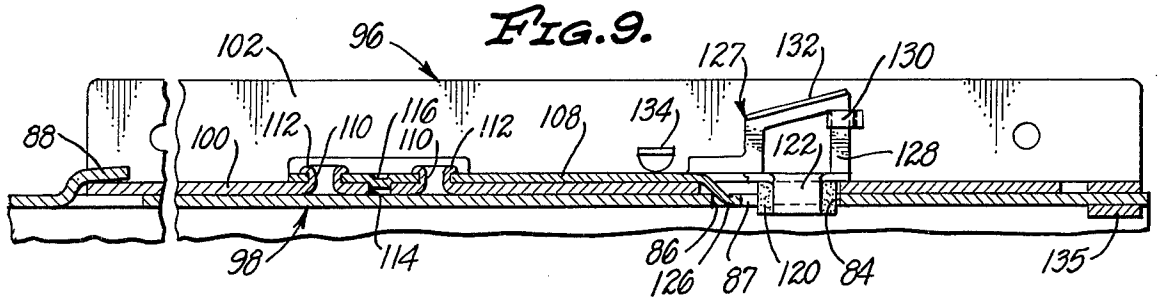


FIG. 10.

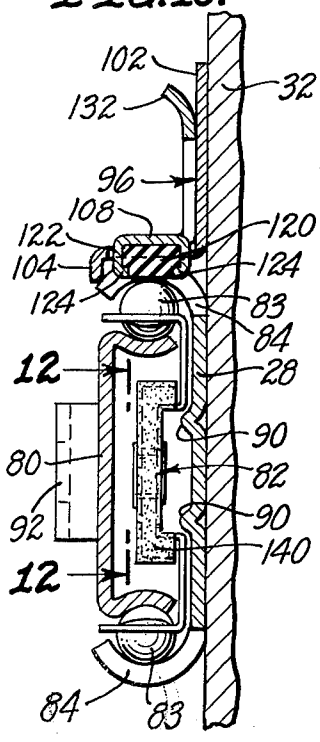


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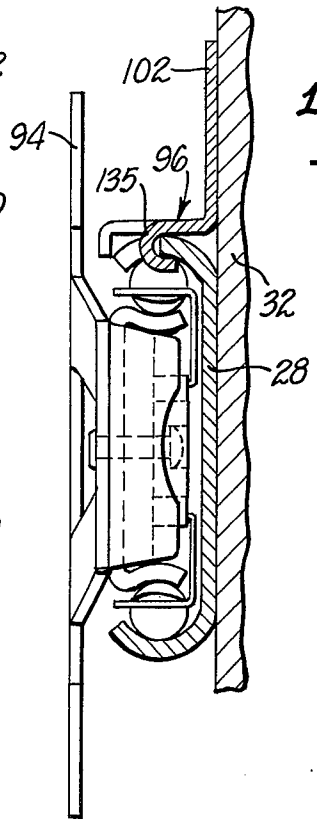


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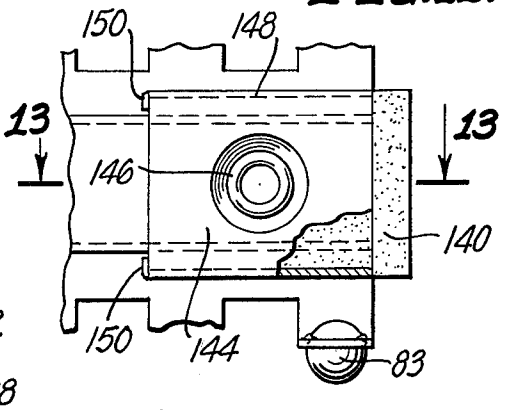


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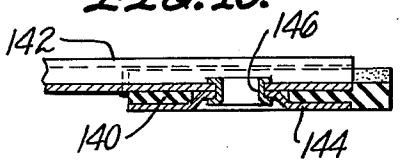


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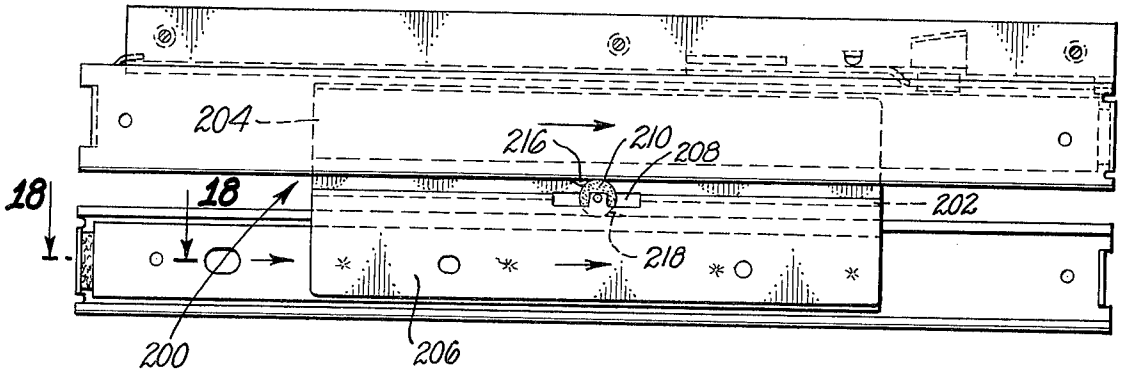


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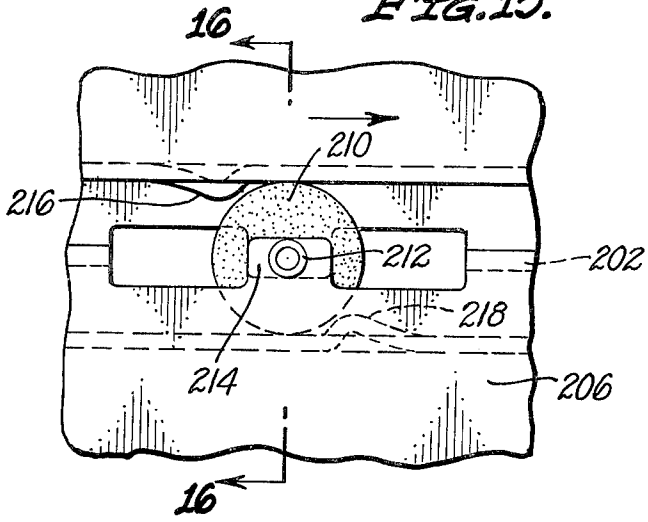


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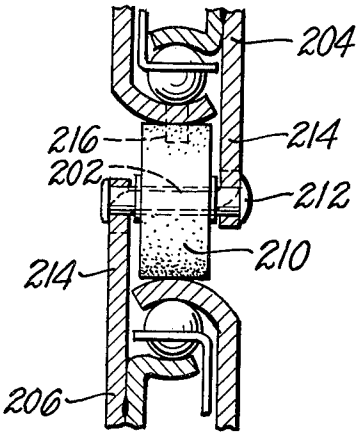


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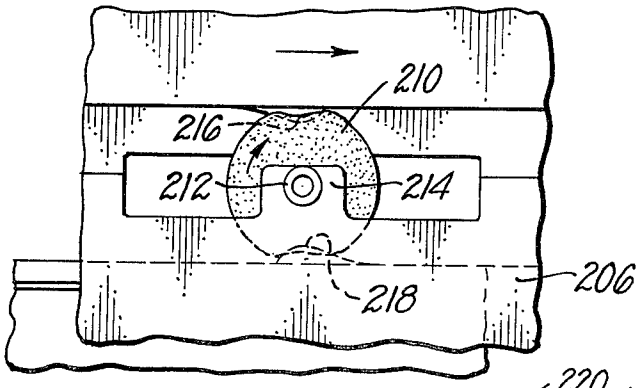
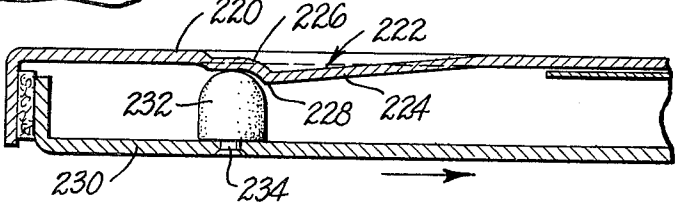


FIG. 18.



ADAPTOR AND LATCHING MEANS FOR REMOVABLY ATTACHING DRAWERS TO TELESCOPING BALL BEARING DRAWER SLIDES

CROSS-REFERENCE TO RELATED APPLICATION

This application, a Continuation-in-part of: Magnus F. Hagen and Fred A. Jordan For: PRECISION TELESCOPING BALL BEARING DRAWER SLIDE SUSPENSION FOR WOOD AND METAL FURNITURE PRODUCTION Ser. No.: 396,593 Filed: Sept. 12, **1973,** now abandoned

BACKGROUND OF THE INVENTION

1. Field of the Invention

While the invention has particular utility embodied in slides for drawers of wood and metal furniture, file cabinets, desks, cabinets and the like, and is shown and described thus embodied, it is to be understood that its utility is not confined, thereto.

2. Description of the Prior Art

There are various types of drawer slides in the prior art of which we are aware having means for removal and replacement of drawers from their slides, but as far as we are aware, these are not satisfactory for various known reasons.

SUMMARY OF THE INVENTION

Our invention comprises mounting means and functional ball bearing slide features which include in their combinations, become a part of the precision telescoping ball bearing slides. There is an adaptor attached to the drawer to provide means whereby a drawer may be easily attached to the slides without the use of tools and may be easily removed from the slides when it is desired to do so. This permits ready attachment of the drawers to the slides so that the drawers may be reinserted or interchanged with other drawers. At the same time, the invention also eliminates what in offices is called today "noise pollution" caused by the noise and metallic clicking when drawers are moved back and forth in such units as file drawers, desk drawers, department store fixture drawers, etc. Thus it contributes greatly to the improvement of office ecology.

In this connection, a sound muffling material is employed and is positioned so that metal to metal contacts are eliminated. The latch mechanism part which drops into a notch provided therefor in the outer slide member, automatically locking the drawer to the slides, prevents any noise or clicking when the moving drawer comes to a stop, either in the open position or the closed position. Thus, the latch or resilient material or block automatically and releasably locks the drawer to the slide without creating any noise when the drawer is moving.

It should be stated that in order to understand the importance of the invention that a precision, ball bearing slide is a linkage connecting a stationary structure with a moving structure, both being connected to this slide.

The invention covers the following areas of telescoping, ball bearing, precision drawer slides:

An adaptor attached to a drawer or the like for providing easy and quick removal of the drawers from the desk, cabinet or the like and easy and quick replacement thereof without the use of tools. This adaptor comprises a mounting rail which is mounted on or attached to the drawer or other moving object;

A locking latch on the adaptors for positively but releasably locking the adaptor to the outer members of the slides. In one arrangement, the locking or latching mechanism locks or latches automatically;

In the automatic latching arrangement, there is a spring for moving the latch to the locking position. This arrangement provides means for disconnecting the drawer rail from the slide so that the drawer may be lifted off the slide without the use of tools;

The invention also eliminates what in offices is called noise pollution caused by the noise and metallic clicking when drawers are moved back and forth in such units as file drawers, desk drawers, department store fixture drawers, etc. Thus, it contributes greatly to the improvement of office ecology;

In the automatic latching arrangement, there are certain very important features. As described above, it is necessary for the side of the rail that slides on the outer member of the slide mechanism to be free from any projecting parts and for this reason, the following is important.

Two holes are extruded upwardly from the rail to provide securing means for the spring latch which has two latching holes aligned with the extruded holes.

The extruded set-ups are then knurled over the spring latch surface thereby fastening it or securing it to the rail.

There is a third hole in the rail between the above mentioned two holes. This hole is merely punched out and receives a dimple in the spring latch which protrudes into the metal hole of the rail to lock it. In this arrangement then, the spring latch is not creating any shear forces upon the two outside knurled over extruded protrusions due to the dimple in the center locking it with the hole in the rail and thus taking the side shear forces. These shear forces are applicable when the latch drops into the slot of the outer member which is provided for the locking function. In other words, when the latch part drops into the slot provided therefor, in the outer member, the drawer is prevented from moving back and forth or being disconnected. Thus, the underside of the rail provides a flush surface resting on the upper ball race of the outer member.

A hold-in detent is holding the drawer in position when closed so that any slide forward tilt of the desk, cabinet or the like, will not let the drawer come out. Also, this hold-in detent arrangement, will prevent the drawer to come out when it is too forcefully closed.

The slide mechanism also includes provision whereby it is reversible, that is, it can be attached to either side of the drawer. Thus, it is not necessary to make right and left-hand mechanisms thereby reducing manufacturing costs.

It is also a part of the invention that it applied to an all-steel, ball bearing, precision, telescoping slide mechanism, which has been patented under U.S. Pat. No. 3,205,025.

The characteristics and advantages of the invention are further sufficiently referred to in connection with the following detailed description of the accompanying drawings which represent certain embodiments and arrangements. After considering these examples, skilled persons will understand that many variations may be made without departing from the principles disclosed, and I contemplate the employment of any structures, arrangements or modes of operation that are properly within the scope of the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring to the drawings, which are for illustrative purposes only:

FIG. **1**, is a perspective view of a slide mechanism installed in a desk and embodying the rail and latch;

FIG. **2** is a fragmentary top plan view thereof attached to a drawer, the latch being in the closed position;

FIG. **3** is a perspective view showing the latch in the unlatched or released position;

FIG. **4** is an enlarged side elevational view of a portion of the slide and rail with the latch in the closed position;

FIG. **5** is an enlarged sectional view taken on line **5—5** of FIG. **4**;

FIG. **6** is an enlarged section view taken on line **6—6** of FIG. **4**;

FIG. **7** is an enlarged fragmentary perspective view of the top edge of a slide member having a notch therein for reception of a resilient block;

FIG. **8** is a side elevational view of an alternative arrangement;

FIG. **9** is an enlarged longitudinal section view;

FIG. **10** is an enlarged sectional view taken on line **10—10** of FIG. **8**;

FIG. **11** is an enlarged sectional view taken on line **11—11** of FIG. **8**;

FIG. **12** is an enlarged fragmentary view taken on line **12—12** of FIG. **10**;

FIG. **13** is an enlarged sectional view taken on line **13—13** of FIG. **12**;

FIG. **14** is a side elevational view showing a hold-in detent arrangement;

FIG. **15** is an enlarged fragmentary side elevational view showing the hold-in detent arrangement of FIG. **14** in the drawer closed position;

FIG. **16** is an enlarged sectional view taken on line **16—16** of FIG. **15**;

FIG. **17** is a very similar view to FIG. **15** but showing the hold-in detent arrangement in a partly closed or partly open position; and

FIG. **18** is an enlarged sectional view of an alternative hold-in detent arrangement.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring more particularly to FIGS. **1 – 5**, there is shown one embodiment of a slide mechanism embodying the present invention and indicated generally at **24**. The mechanism includes the usual outer slide member indicated generally at **28** and an inner slide member, not shown, in FIGS. **1 – 5**, but shown and described hereandafter.

In FIG. **1**, there is shown a desk or cabinet **30** having a drawer **32**, it being understood, of course, that there may be more than one drawer, the inner slide member in this figure being hidden from view since it is fastened to an adjacent part of the desk or cabinet.

Also, it is to be understood that there is a slide mechanism for each side of the drawer. As shown in FIG. **1**, the drawer is in an outward or open position. The outer slide members of the slides at opposite sides of the drawer are free to slide into and out of the cabinet **30**.

The outer slide member **28**, FIG. **1**, is shown to be in its extended position and it should be noted that the outer slide element is not affixed to the drawer side wall **34**.

The means for attaching the desk drawer to the slides comprises an adaptor or drawer attachment, indicated generally at **36**, which in cross-section, is shaped like a Z lying on its side. That is, there is a horizontal portion **38**, a vertical upstanding portion or flange **40** along one longitudinal edge of the horizontal portion, and a depending portion or flange **42** along the opposite longitudinal edge.

The longitudinally extending vertical portion or flange **40** has a plurality of longitudinally spaced openings for screws **44** for attaching the adaptor **36** to side **46**, FIG. **1**, of the drawer **32**.

The longitudinally extending horizontal portion **38** has a locking clamp, indicated generally at **48**.

The locking clamp **48** comprise a lever **50** pivotly attached to the horizontal part **38**, sometimes termed the rail, by any suitable means such as a rivet **54** adjacent one end so as to be freely movable in a horizontal plane.

Adjacent the opposite end is an upstanding ear **56** so that the lever may be easily actuated between locking and release position. Intermediate the ends of lever **50**, there is a flange **60** depending at right angles from the outer edge of the lever and at the lower end of flange **60**, is an inturned lip **62** normal to said flange **60**. As shown, the locking lip **62** of the locking clamp **48** fits under and engages the free edge **64** of the outer slide member **28**. When in this closed position, the locking clamp **48** now vertically locks together the adaptor **36** and the outer slide element **28**, the engagement of the horizontal part **38** of the rail and the top of the outer slide member **28** effects secure locking together of the adaptor and the outer slide member.

To release the adaptor from the outer slide **28**, latch **48** is manually actuated by means of the upstanding ear **56** to the release position shown in FIG. **3**.

As shown in FIG. **5**, there is also a locking block **68** which is affixed to the under side of the lever **50** by means of a rivet **70** although any other suitable fastening means may be used. The locking block **68** is adapted to fit into a locking slot **72** in the upper portion of the outer slide element **28**. More specifically, slot **72** is in the upper ball race **74** of said outer slide member.

While the locking block **68** may be formed of any suitable material, it has been found preferable to use a resilient material such as rubber, urethane or the like. The locking block **68** has a fairly snug fit in the locking slot **72** of the outer slide element but a limited amount of longitudinal movement may occur and the resilient material is sound absorbing or muffling to substantially eliminate noise.

The drawer **32** is illustrated with its inner end positioned within the cabinet **30** and with the adaptor **36** resting on the top of the outer slide element **28**. When installing the drawer, the locking clamps are open and the drawer is lowered onto the slide member **28**, the lower surface of the horizontal part **38** of the adaptor coming to rest on the top of the outer slide element **28** so that the slide thus supports the weight of the drawer and its contents. Moreover, the locking block **68** of the locking clamp **48** enters the locking slot **72** of the outer slide element **28** when the locking clamp is moved to the closed position. Thus, the mutual engagement of these parts provides a longitudinal locking action that prevents the drawer from moving axially relative to the

outer slide element **28.** While it is not shown, there is a similar arrangement on the other side of the drawer **32** so that both sides of the drawer are longitudinally locked in place relative to the outer slide member of the slides and are supported thereby. When the locking clamp is moved to the closed position, the inturned lips **62** engage the free edge portion **64** of the ball races **74** of the outer slide members to lock the drawer against lifting or vertical movement.

Now, the drawer may be pushed into or pulled outwardly of the cabinet, the longitudinal locking arrangement between the locking block and the locking slot assure that the slide mechanism operates as designed, and also assures that the drawer may be easily removed by unlocking the locking clamp and lifting the drawer from the sides whenever so desired.

Once the drawer and its affixed adaptors **36** have been lowered onto the outer slide member **28,** their respective cross-sections appear as indicated in FIG. **6.** It will be seen from this illustration that the drawer side wall **46** and its affixed adaptor now engage the upper portion of the outer slide member **28** in such a way that the outer slide member **28** is "pinched" between the drawer side wall **46** and the vertical part **40** with the upper portion of the outer slide member **28** supporting the weight of the drawer by means of the horizontal part **40.** Thus, the engagement of the depending part **42** of the adaptor, coacts with the upper ball race of the outer slide member to prevent transverse movement relative to each other and thus produces transverse locking between the drawer and the slide mechanism.

When the drawer is supported by the slide mechanisms, the horizontal portion **38** of the adaptor floats or slightly rests on the curved top portion of the top races **74** of the outer slide members **28.** The depending flanges **42** of the adaptors depend along side the free edges of said top races of the outer slide member to thereby aid in retaining the drawer in proper alignment with the slides.

When the drawer is in its closed position, the inner and outer members of the slides are fully telescoped and the adaptor is fully retracted, that is, said adaptor is at its furthest inward position on the top bearing races of the respective outer slide members.

When the drawer is pulled out, the outer slide members **28** of the respective slides first move outwardly to their limit of movement. Up to the point at which the outer slide members are stopped by the usual limiting means, the adaptors remain at the position on the top races of the outer slide members, but, when the outer slide members are stopped, the drawer may be further pulled out with the adaptors sliding on said top races of the outer slide members of the slides at opposite sides of the drawer by releasing the locking clamps, the drawers thus being released and adapted to be pulled to the fully extending position whereat the rear end of the drawer is clear or substantially clear of the desk at the drawer opening.

Should it be desired to remove the drawer, it is pulled outwardly from the closed position to the fully extended position. It may then be lifted off the slides after the locking clamps have been released. To replace the drawer, the reverse procedure is followed.

Thus, it will be apparent that the drawer may be easily and quickly removed from the slides of the desk or cabinet and easily and quickly replaced. Further, it will be apparent that a drawer may be removed and replaced by another drawer.

The slides are also practically noiseless and extremely smooth in action. Opening and closing the drawers is practically effortless requiring but a light touch. Removal and replacement of drawers may be effected quickly and easily.

Another advantage of the present invention is that the outer slide member may be provided with a similar notch **72** in the lower ball race. With this arrangement, the slides may be reversed. That is, the slides may be attached at either side without otherwise being specially constructed for such an arrangement.

FIGS. 8, 9, 10 AND 11

Referring to FIGS. **8, 9, 10** and **11,** there is shown an alternative adaptor and slide arrangement.

The slide mechanism includes the outer slide member **28** of the ususal well-known character and an inner slide member **80,** there being a ball retainer indicated generally at **82** which retains the ball bearings **83** and spaces them apart in the ball races of the inner and outer slide member. The upper ball race of the outer slide member is provided with a pair of notches **84** and **86,** separated by dividing part **87,** notch **84** being of greater size than notch **86** and being closer to the end of the slide. Notch **86** is actually a rearward extension of notch **84** and connects with the rear of notch **84.** Adjacent its inner end, the outer slide member has a raised tab **88** lanced from the upper ball race thereof and opening forwardly.

The slide member **80** is attached within the inner desk opening or other fixed part, while the outer slide member carries the drawer as will be here and after fully described. The inner slide member has resilient parts **92** and **94** whereby said inner slide member is attached to the desk, cabinet or the like. It is to be noted that the outer slide member is provided with ridges **90** in the bottom thereof and in the region of the openings **84** and **86** to thereby strengthen this part of the outer slide member.

Referring more particularly to the adaptor of FIGS. **8, 9, 10** and **11,** said adaptor is indicated generally at **96.**

Adaptor **96** comprises what is termed herein a rail **98** of generally in the shape of a Z lying on its side. There is a horizontal part **100** along one edge, the rail has an upstanding or vertical flange **102** and along the opposite edge, there is a depending flange **104.** Horizontal part of the rail is adapted to normally rest upon the upper ball race of the outer slide member. The rail may also slide upon the upper ball race under certain conditions described hereandafter.

Flange **102** is secured to the side of the drawer by means of screws **106** or by any other suitable means.

Adjacent the forward end of the adaptor rail is a down-turned and slightly in-turned guide and connector which is in the general shape of a U lying on its side and indicated generally at **135,** the purpose of which will be described hereandafter.

The releasable clamping mechanism comprises a latch or locking arrangement comprising an elongated resilient spring **108.** Spring **108** normally lies on the horizontal part **100** of the rail and the rear end of said spring is secured to said horizontal part of the rail by a unique fastening means comprising upward extrusions **110** from the horizontal part of the rail so that the

under surface of the horizontal part **100** of the rail is smooth. There are two holes in the spring latch **108** through which the extrusions **110** extend and are riveted over at their ends **112** thereby securing the spring latch to the horizontal part of the rail. A hole **114** is also provided in the horizontal part of the rail intermediate the extrusions **110** and a dimple **116** formed downwardly in the spring latch, extends into hole **114** and does not extend below the lower plane of the spring latch. This provides a very effective lock so that the spring latch does not create any shear forces upon the two extruded parts since the dimple thus takes any side shear forces. These shear forces are applicable when the latch drops into the slot of the outer member preventing the drawer from moving backward and forward or being disconnected.

At the forward free end of the spring latch **108,** there is a holder for a piece of sound muffling material **120,** the holder for this material comprises a pair of depending ears **122** spaced apart and having inturned end portions **124** which extend beneath the piece of material **120.** Thus, the piece of material **120** is clamped between the inturned portions **124** and the adjacent part of the spring latch. Toward the rear of the piece of material is a downwardly and forwardly inclined tongue **126,** which functions as a cam, and is lanced from the spring latch and normally rests in the notch extension **86** as best shown in FIGS. **8** and **9.** Spring latch **108** has an upturned flange-like structure **127** which is at the side adjacent the upturned flange **102.** This structure has an opening therein with a vertical part **128** adapted to be slidingly received in the space between an ear **130** lanced from the vertical part **102** of the rail and spaced outwardly a sufficient distance to slidingly receive the vertical part **128.** Structure **127** has a laterally turned flange **132** which is adapted to be engaged by the thumb or other digit of the operator and an outwardly turned stop **134** is lanced laterally from the vertical flange **102.** Stop **134** is spaced upwardly of the spring latch a sufficient distance to permit the free end of the latch to be raised to clear the material **120** and the tongue **126** from the openings **84** and **86** thereby releasing the adaptor from the outer slide member.

With the adaptors attached to the respective sides of a drawer, the drawer is placed on the slide members with the horizontal part of the rail of the adaptor resting on the upper ball races of the outer slide members. When thus placed on the ball races of the outer slide members, the muffling material or block **120** and the tongue or cam **124** rests on the horizontal part of the rail forwardly of notches **84** and **86** and is forced upwardly against the spring tension of spring latch due to the weight of the drawer. The drawer is then slid rearwardly and, as this is done, the outer end of the upper ball race, which is slightly notched along the free edge, slides into the guide and connector **135** thereby interconnecting the front end of the adaptor and the front end of the outer slide member. Slightly further movement of the drawer rearwardly causes the rear end of the horizontal part of the rail to pass beneath the tab or ear **88** thereby interconnecting the rear end of the adaptor and the rear end of the outer slide member. These end parts become interconnected prior to the entrance of the block or muffling material **120** into the forward opening in the upper ball race of the outer slide member. As the drawer is moved further rearwardly, the free end of the cam **126** passes onto the dividing part **87** and keeps the forward free end of the latch spring **108** raised. Still further rearward movement of the drawer causes the free end of the cam **126** to drop into the opening **86** of the upper ball race of the outer slide member and simultaneously allows the block or muffling material **120** to drop into the opening **84,** thus, preventing linear or longitudinal movement of the adaptor and outer slide element. The structure **127** is held against lateral displacement by the ear **130.**

To remove the drawer from the slide mechanisms, the forward free end of the spring latch is raised by means of the flange **132** to a position whereat said spring latch engages the stop **134** thus clearing the block **120** and the cam **126** with respect to the upper ball race of the outer slide member. The drawer then may be moved forwardly to disengage the forward ends of the adaptor and outer slide member as well as the rear ends of these parts. The drawer may then be lifted from the slides and removed. Replacing of the drawer is effected by placing it on the slide mechanisms with the horizontal part **100** of the rail of the adaptor resting on the upper ball race of the outer slide members. Securing the adaptors and outer slide members together is effected as above described.

Laterally-turned flange **138** provides a stop at the rear part of the slide mechanism and there is a block **140** which serves as a bumper and sound muffler. This block is attached to the central part **142** of the ball retainer, said bumper projecting longitudinally outwardly of the ball retainer and clamped onto said central part **142** by means of a shallow channel-shaped bracket **144** which is attached to the central part of the ball retainer by means of a rivet **146.** A similar bumper is similarly attached to the opposite end of the ball retainer. Thus, clicking noises are effectively muffled when either end of the ball retainer strikes a stop. It is also to be noted that the sides **148** of the bracket **144** has inturned end parts **150** which aid in preventing displacement of the bumpers as they strike stops.

HOLD-IN STOPS

FIGS. 14 – 17 INCLUSIVE

In one type of slide mechanism, there is an intermediate member indicated generally at **200,** having a horizontal part **202** with upwardly and downwardly extending flanges **204** and **206.** This member has a notch or opening **208** intermediate its ends and there is a roller **210** of resilient material such as rubber, plastic or the like carried on a rivet **212** or the like. The rivet may be of any suitable type and extends through openings provided therefor in ears **214** extending downwardly and upwardly from the respective flanges **204** and **206.**

There are a pair of slide mechanisms secured to the flanges **204** and **206,** the inner slide members thereof being the parts secured to said flanges. The slide members are in generally the same plane and the lower ball race of the outer slide member of the upper slide mechanism is provided with a depending arcuate shaped boss **216** and the upper ball race of the outer slide member of the lower slide mechanism is provided with a similar boss **218.** These bosses are in the path of movement of the roller **210** and when the slide members are in the retracted position, the bosses **216** and **218** are at opposite sides of the roller **210** and substantially in contact with the periphery of said roller. Thus, when the slide mechanisms are telescoped and in their retracted position, they are normally held against ex-

tension by reason of the bosses engagement with the roller **210.**

While the slide mechanisms are held against extension by the bosses, said slide mechanisms may be extended by a force sufficient to overcome the holding of the roller between the bosses. Since the roller is of resilient material, it does not require a great deal of force to release the slide mechanisms to permit their extension.

This arrangement is for the purpose of releasably holding the drawer or the like supported by the slides in the closed position so that the drawer will not slide open should the cabinet, desk or the like be slidably inclined in a direction that would otherwise cause the drawer to slide open. Also, this arrangement, prevents the drawer from snapping or bumping out when it is closed.

Referring to FIG. **18,** there is shown an alternative hold-in stop mechanism. In this arranagement, the bottom wall **220** is provided with a pressed-out portion indicated generally at **222.** This portion has a part **224** inclined laterally and toward the adjacent end of the slide member. At the rear end of the part **224,** there is a part **226** which is curved toward the adjacent wall of the slide member to provide a hump **228.** The other slide member **230** is provided with a frictional button of a suitable plastic, such as, for example, nylon, teflon or the like. This button is secured to the bottom of the slide member **230** by means of a rivet **234** or any other suitable means. The free end of the buttom is rounded and is adapted to be at the outer side of the hump **228** when the slide members are telescoped and thus, hold the slide members in the telescoped position under normal conditions. When it is desired to extend the slide members, a sufficient force may be readily applied to cause the button to ride over the hump **228** and thus release the slide members for normal extension.

Both of these arrangements serve the same purpose of holding the slide members in a telescoped position so that the drawer carried by the slides, will not inadvertently slide open. The resistance of the parts holding the slide members telescoped is not great and the drawer may be readily pulled open.

SUMMARY

Thus, we have provided slide mechanisms which have means for removably mounting drawer slides and latching or locking drawers on the slides. The mounting means comprise adaptors attached to the sides of a drawer and the latching or locking means for securing the adaptors and the slide mechanisms together, hold the adaptors from being lifted from the slide mechanisms and also hold the adaptors from sliding on the slide mechanisms when the latching means are in the latching or locking position. Also, by having the notches or openings for the latching means on both upper and lower parts of the outer slide members, the slide mechanisms may all be formed the same and a mirror reversal of the slide mechanisms make it possible to use these same slide mechanisms for either side of the drawer.

There are also novel bumper arrangements for muffling noises when parts of the slides reach stops.

A further feature of the present invention includes hold-in stops which hold the drawer in position when closed so that any slide forward tilt of the desk, cabinet or the like will not let the drawer come out. Also, holdin stops or detents, prevent the drawer from bumping out when it is too forcefully closed.

The invention and its attendent advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts of the invention without departing from the spirit or scope thereof or sacrificing its material advantages, the arrangement hereinbefore described being merely by way of example, and we do not wish to be restricted to the specific form shown or uses mentioned except as defined in the accompanying claims.

We claim:

1. A drawer slide mechanism, comprising:

an outer slide member having facing ball races along the longitudinal side edges thereof;

an inner slide member having oppositely facing ball races along the longitudinal side edges thereof, the ball races of the inner slide member being spaced inwardly from and facing respective adjacent ball races of the outer slide member to provide operable space for balls;

balls in the space between the respective adjacent ball races of outer and inner slide members;

a generally channel-shaped ball bearing retainer disposed between the outer and inner slide members, said ball bearing retainer having flanges at the outer longitudinal edges between adjacent ball races of the outer and inner slide members, said flanges having openings for the balls, said openings being of smaller size than the diameter of the the inner slide member being spaced inwardly from and facing respective adjacent ball races of the outer slide member to provide operable space for balls;

balls in the space between the respective adjacent ball races of outer and inner slide members;

a generally channel-shaped ball bearing retainer disposed between the outer and inner slide members, said ball bearing retainer having flanges at the outer longitudinal edges between adjacent ball races of the outer and inner slide members, said flanges having openings for the balls, said openings being of smaller size than the diameter of the balls so said balls are held in the races of the outer slide member by the flanges of said ball bearing retainer;

and a drawer mounting adaptor adapted to be attached to the side of a drawer and resting on the top of the outer slide member of a slide mechanism;

balls so said balls are held in the races of the outer slide member by the flanges of said ball bearing retainer;

and a drawer mounting adaptor adapted to be attached to the side of a drawer and resting on the top of the outer slide member of a slide mechanism;

a first releasable means for holding the adaptor against being lifted from the wall raise of the outer slide member;

and a second releasable means for holding the adaptor against sliding longitudinal movement on the ball race of the slide mechanism.

2. A drawer slide mechanism, comprising:

an outer slide member having facing ball races along the longitudinal side edges thereof, the outer slide

member having a notch in the upper ball race adjacent the front end thereof;

an inner slide member having oppositely facing ball races along the longitudinal side edges thereof, the ball races of a locking clamp operably carried by the adaptor and movable between a locking position and a release position, said locking clamp having a part for engaging the upper ball race of the outer slide member for holding the adaptor from being lifted off said upper ball race when the clamp is in the locking position;

and a locking block on said locking clamp disposed in the notch of the upper ball race of the outer slide member when the locking clamp is in the closed position for holding the adaptor against longitudinal movement relative to the outer slide member.

3. The invention defined by claim **1,** wherein the adaptor includes a longitudinally extending rail having a horizontal part and a vertical flange upstanding from one edge of the horizontal part for attachment to the side of a drawer; a lever pivoted to the horizontal part and movable between a latching position and a release position, said lever having a depending part with an inturned end portion adapted to be moved under the free edge of the upper ball race of the outer slide member, and a block of muffling material secured to said lever and disposed in the notch in the upper ball race of said outer member.

4. An adaptor for attachment to a side of a drawer for mounting same on a slide mechanism having an outer slide member;

said adaptor having a rail in the general shape of a Z lying on its side and including a horizonal part;

a lever having one end pivotly attached to the horizontal part of the rail;

a depending part intermediate the ends of the lever and carried thereby, an inwardly turned flange in general parallel spaced relation to the lever for engaging the free edge of the upper ball race of the outer slide member when the latch is in the closed position, a block of material secured to the underside of the lever and an upstanding ear at the adjacent end of the lever for facilitating moving the lever between the locked position and the unlocked position.

5. An adaptor for detachable attachment to a slide member of a slide mechanism, having a pair of openings in the ball race of the outer slide member adjacent one end, comprising:

an elongated rail in the general shape of a Z lying on its side, said rail including a horizontal part and an upstanding vertical part attachable to the side of a drawer;

a spring latch having one end secured to the horizontal part of the rail and normally lying on the top surface of the rail;

a block of sound muffling material secured to the free end portion of the spring latch;

a tongue inclined downwardly and toward the block of material lanced from the spring latch, said horizontal part of the rail having a pair of openings spaced longitudinally apart and adapted to receive the block of material and the tongue when the latch is in the closed position;

and means for raising the free end of the spring latch.

6. The invention defined in claim **5** including a second pair of openings in the opposite ball race of the outer slide member.

7. The invention defined by claim **5,** wherein the spring latch is normally in the closed position.

8. The invention defined by claim **5,** wherein there are two extrusions in the horizontal part of the rail, said extrusions being spaced apart longitudinally of the rail and upwardly, and an opening through the horizontal part intermediate said extrusions; said spring latch **108** having a pair of openings adjacent the free ends in which the extrusions are received, the free ends of said extrusions being riveted over; and a dimple formed in the spring latch extending into the opening between said extrusions, said dimple extending part-way through said opening so that it does not extend beyond the lower surface of the spring latch.

9. The invention defined by claim **8,** including a guide on the upstanding flange of the rail for holding the clamp member against lateral displacement.

10. The invention defined by claim **9,** including a stop for limiting raise of the free end of the spring lever.

11. The invention defined by claim **5,** in combination with a slide mechanism having an outer slide member, said slide member including a ball race and a tab raised above the top of the ball race and facing forwardly for reception of the rear end of the horizontal part of the rail; a U-shaped guide at the forward end of the rail for reception of the forward end of the outer slide member.

12. The invention defined by claim **5,** wherein the slide mechanism includes a ball retainer and a block of sound muffling material fitting over the central portion of said ball retainer, a shallow channel-shaped bracket disposed over the block of material with an end portion of said material extending beyond said block and adjacent end of the ball retainer; rivet means securing the bracket to the ball retainer and clamping said block of material onto said ball retainer; and inturned end portions at the rear end of the bracket for engaging the adjacent end of the block for holding the block against inward movement.

13. The invention defined by claim **5,** wherein there are a plurality of longitudinally extending substantially parallel ridges in the bottom of the outer slide member extending beyond the openings in the ball race of the outer slide member.

14. A slide mechanism, comprising:

an intermediate member of generally Z shaped in cross-section, the Z lying on its side, said intermediate member having a horizontal part with oppositely extending flanges along each side of said horizontal part;

a slide mechanism including an inner slide member and an outer slide member having the inner slide member attached to one of the flanges;

a slide mechanism having inner and outer slide members and having the inner slide member attached to the other flange, said intermediate member having an opening therein intermediate the ends thereof;

a resilient roller rotatably mounted to adjacent portions of the intermediate member and occupying a part of the opening in said intermediate member;

a boss extending outwardly of the ball race of one of the outer slide members and in the back of the roller;

a boss extending from the ball race of the outer slide member of the other slide mechanism and in the back of the roller;

said roller being disposed between the bosses when the slide mechanisms are telescoped but adapted to roll over said bosses when the slide mechanisms are extended.

15. A slide mechanism, including:

inner and outer slide members in telescoping relationship, each of said slide members having a bottom wall;

a portion pressed-out of the bottom wall of the outer slide member and including a ramp inclined downwardly and toward the adjacent end of the outer slide member, said pressed-out portion having a part inclined upwardly and toward the adjacent end of the slide member, there being a hump at the junction of said parts;

a button secured to the bottom wall of the inner slide member, said button having its free end positioned for engagement with the hump when the slide mechanism is telescoped.

16. The invention defined by claim **15,** wherein the button is of resilient material.

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